Response to

Request for Additional Information No. 49 (873) Supplement 1, Revision 0

8/21/2008

U. S. EPR Standard Design Certification
AREVA NP Inc.
Docket No. 52-020
SRP Section: 03.09.06 - Functional Design Qualification and Inservice Testing Programs for Pumps, Valves, and Dynamic Restraints
Application Section: 3.9.6
CIB1 Branch

Question 03.09.06-5:

In the IST program for valves, please address the following additional requirements:

1. As required by ISTC-5220, air release and vacuum breaker valves (identified as 30PEB10AA190, 30PEB10AA191, 30XJG10AC001, 30PEB20AP001, SAQ20AC001, 30XJG20AC001, 30XJG30AC001, PEB30AP001, SAQ30AC001, 30XJG40AC001, PEB40AP001, and SAQ40AC001) should have a stroke testing frequency of 2-years.
2. The IST valve table needs to show valve sizes and associated P&ID drawing numbers.
3. Since the main steam isolation valves are single inline components and are required to isolate flow in the forward and reverse direction, address the need for leak testing in each direction.
4. On the safety injection system P&ID (Figure 6.3-3), there are shown 3-port power -operated valves (30JNK10AA001, 30JNK20AA001, 30JNK30AA001, and 30JNK40AA001) that should be added to the IST program.
5. There are valves in the IST table (30JMQ41AA002, 30JMQ42AA002, 30JMQ43AA002, 30JNG10AA010, 30JNG20AA010, 30JNG30AA010, 30JNG40AA010) that have a passive designation which is inconsistent with having both open and closed safety positions.
6. The IST table should indicate that all power-operated valves requiring an exercise test should also require a stroke time test (ISTC-5113).
7. In accordance with ISTC-3560, required fail-safe testing should be indicated in the IST table.

Response to Question 03.09.06-5:

1. The NRC question states that as required by ISTC-5220, air release and vacuum breaker valves should have a stroke testing frequency of two years. ISTC-5220 only applies to check valves. Inservice testing (IST) requirements for vacuum breaker and air release valves are provided in ISTC-5230 (vacuum breaker valves) and ISTC-5240 (safety and relief valves), as noted in ASME Operation and Maintenance (OM) Code Table ISTC-3500-1, Inservice Test Requirements. ASME OM Code Table ISTC-3500-1 also lists valve exercise test procedure and frequency requirements for Category C (safety and relief) valves per ISTC-5230 and ISTC-5240. Both ISTC-5230 and ISTC-5240 refer to ASME OM Code Mandatory Appendix I for test requirements. ASME OM Code Mandatory Appendix I, I-1350 requires a ten year test interval for Class 2 and 3 pressure relief valves (except main steam safety valves), and I-1380 requires a two year test interval for Class 2 and 3 vacuum relief valves (except primary containment vacuum relief valves).

   Of the components listed in the question, only two are vacuum breakers (i.e., 30PEB10AA190 and 30PEB10AA191). As noted in U.S. EPR FSAR, Tier 2, Table 3.9.6-2, valve 30PEB10AA190 currently has a two year test frequency. U.S. EPR FSAR, Tier 2, Table 3.9.6-2, will be revised to indicate a two year test frequency for valve 30PEB10AA191 and corresponding valves 30PEB20AA191, 30PEB30AA191, and 30PEB40AA191 (Note: the numbers for these have been corrected to 30PEB11AA191, 30PEB21AA191, 30PEB310AA191, and 30PEB410AA191, respectively) . The remaining items listed are pumps and heat exchangers that are supported by air release and vacuum breaker valves. The pumps in question are listed in U.S. EPR FSAR, Tier 2, Table 3.9.6-1. IST requirements do not apply to heat exchangers.

2. AREVA NP does not understand the regulatory basis for this question, since neither RG 1.206 nor SRP 3.9.6 require valve sizes and associated piping and instrumentation diagram (P&ID) drawing numbers to be identified in U.S. EPR FSAR, Tier 2, Table 3.9.6-2 . The valve sizes and associated P&ID drawing numbers for the valves listed in U.S. EPR FSAR, Tier 2, Table 3.9.6-2 are available for NRC inspection.
3. As stated in U.S. EPR FSAR, Tier 2, Section 10.3, the main steam isolation valves (MSIV) are required to isolate (in the forward flow direction) the main steam lines in the event of excessive steam flow. This prevents over-cooling of the reactor coolant and retains activity by steam-side isolation in the event of a steam generator tube rupture. Failure of the MSIVs to isolate in the reverse flow direction does not result in, or increase the severity of, any credible event. Since the MSIVs are not required to isolate in the reverse flow direction, they are leak tested only in the forward flow direction.
4. The valves in question, along with other valves from this system, will be added to U.S. EPR FSAR, Tier 2, Table 3.9.6-2.
5. Valves 30JNG10AA010, 30JNG20AA010, 30JNG30AA010, and 30JNG40AA010 are cross-connect isolation valves. They are classified as passive because they are only open when maintenance of a train is required; otherwise, they are closed. When the valves are open, electrical breakers are racked-out, to prevent single failure. The valves do not receive a safety injection (SI) signal with open or closed positions, which is why they have a passive designation. U.S. EPR FSAR, Tier 2, Table 3.9.6-2 will be revised to change the designation of valves 30JMQ41AA002, 30JMQ42AA002, and 30JMQ43AA002 as active.
6. Stroke-time testing for power-operated valves is specified in U.S. EPR FSAR, Tier 2, Section 3.9.6.3. The IST requirement for measuring the stroke time for valves is performed in conjunction with a valve exercise inservice test. The stroke time test is not identified as a separate IST.
7. The switch for a fail-safe valve functions by interrupting (de-energizing) the electrical or pneumatic actuating force for the valve whenever the switch is moved to the fail-safe position. Therefore, this normal valve operation demonstrates the valve's fail-safe capability, which is verified during valve exercise testing by remote position indication. Since a successful exercise test satisfies a valve's fail-safe testing requirements, a separate test for fail-safe capability is not required and is not specified in U.S. EPR FSAR, Tier 2, Table 3.9.6-2.

FSAR Impact:

U.S. EPR FSAR, Tier 2, Table 3.9.6-2 will be revised as described in the response and indicated on the enclosed markup.

Question 03.09.06-6:

In discussing inservice operability testing of power-operated valves, the applicant states that this testing includes testing in static system conditions with diagnostic measurements or dynamic system conditions that include flow and differential pressure. Although the lessons learned from operating experience have proven that static tests are ineffective for assessing the design-basis capability of MOVs, the applicant should clarify the use of static tests for operability determinations of POVs.

Response to Question 03.09.06-6:

As stated in U.S. EPR FSAR, Tier 2, Section 3.9.6.3.2, the power operated valve (POV) inservice testing (IST) program incorporates industry and regulatory experience (including Generic Letters 89-10 and 96-05, and INPO operating experience) and information gained through analysis, design, maintenance, and testing of the valves within specific safety-related systems. The IST program for POVs includes programmatic features similar to the Joint Owners Group (JOG) Program in response to Generic Letter 96-05. Specifically, when the margin between component capability and design-basis requirements is known to be adequate, static testing is appropriate. When the margin between component capability and design-basis requirements have not been previously determined due to different valve design features, materials, or operating parameters, dynamic testing is performed to determine these margins.

FSAR Impact:

The U.S. EPR FSAR will not be changed as a result of this question.

Question 03.09.06-7:

The design of the U.S. EPR system should incorporate provisions to permit all safety-related check valves to be tested for performance in both the forward and reverse flow directions. The ASME OM Code (2004 Edition) includes this requirement for bi-directional testing of check valves (as does the 1995 Edition of the ASME Code through the 2003 Addenda as is currently incorporated by reference in 10 CFR 50.55a(b)(3)). Specifically, the Code states that the necessary valve obturator movement during exercise testing shall be demonstrated by performing both an open and close test. Does the U.S. EPR system design incorporate provisions, including alternate flow paths and required instrumentation, to allow for bi-directional flow testing of check valves? For which check valves is bi-directional flow testing impractical? What alternative testing is proposed by the applicant for these check valves?

Response to Question 03.09.06-7:

As stated in U.S. EPR FSAR, Tier 2, Section 3.9.6.1, the U.S. EPR design provides access to structures, systems, and components (SSC) to facilitate comprehensive testing. This includes, where practical, alternate flow paths and instrumentation to allow for bi-directional flow testing of check valves. Check valves which may not practically be bi-directionally flow tested, if any, will be identified during preservice testing.

U.S. EPR FSAR, Tier 2, Section 3.9.6.3.3 describes alternative testing for those check valves for which bi-directional flow testing may be impractical. As stated in this section, the operability of such check valves may be demonstrated by a mechanical exerciser or, where this method is also determined to be impractical, by a sample disassembly and examination program to verify valve obturator movement. The sample disassembly examination program will group check valves by category of similar design, application, and service condition in accordance with applicable guidance, such as that presented in NUREG-1482.

FSAR Impact:

The U.S. EPR FSAR will not be changed as a result of this question.

U.S. EPR Final Safety Analysis Report Markups

Table 3.9.6-2—Inservice Valve Testing Program Requirements
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Valve Identification Number[1]	Description/ Valve Function	Valve Type[2]	Valve Actuator[3]	ASME Code Class[4]	ASME OM Code Category[5]	Active / Passive[6]	Safety Position[7]	Test Required[8]	Test Frequency[9]	Comments
30JMM21AA002 - AA008	Leak Off (outside containment to annulus) outer CIV	GB	MA	2	A	P	C	ET LT PI	CS 2Y 2Y	LT per 10 CFR 50, Appendix J
30JMM30AA003	Pressure measurement outer CIV	GB	MA	2	A	P	C	ET LT PI	CS 2Y 2Y	LT per 10 CFR 50, Appendix J
30JMQ40AA001	SAHRS outside CIV	GB	MO	2	A	A	C	ET ST LT PI	Q Q 2Y 2Y	LT per 10 CFR 50, Appendix J
30JMQ41AA001	SAHRS outside CIV	GB	MO	2	A	A	C	ET ST LT PI	Q Q 2Y 2Y	LT per 10 CFR 50, Appendix J
30JMQ41AA002	SAHRS inside CIV	CK	SA	2	A/C	~~P~~A	O/C	ET LT PI	CS RF 2Y	LT per 10 CFR 50, Appendix J
30JMQ42AA001	SAHRS outside CIV	GB	MO	2	A	A	C	ET ST LT PI	Q Q 2Y 2Y	LT per 10 CFR 50, Appendix J
30JMQ42AA002	SAHRS inside CIV	CK	SA	2	A/C	~~P~~A	O/C	ET LT PI	CS RF 2Y	LT per 10 CFR 50, Appendix J

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Valve Identification Number[1]	Description/ Valve Function	Valve Type[2]	Valve Actuator[3]	ASME Code Class[4]	ASME OM Code Category[5]	Active / Passive[6]	Safety Position[7]	Test Required[8]	Test Frequency[9]	Comments
30JMQ43AA001	SAHRS outside CIV	GB	MO 03.09.06-5	2	A	A	C	ET ST LT PI	Q Q 2Y 2Y	LT per 10 CFR 50, Appendix J
30JMQ43AA002	SAHRS inside CIV	CK	SA	2	A/C	~~P~~A	O/C	ET LT PI	CS RF 2Y	LT per 10 CFR 50, Appendix J
30JNA10 AA001	RHR 1st RCPB Isolation Valve (PIV)	GT	MO	1	A	A	O/C	ET LT PI	CS 2Y 2Y	Pressure Isolation Valve
30JNA10 AA002	RHR 2nd RCPB Isolation Valve CIV (PIV)	GB	MO	1	A	A	O/C	ET LT PI	CS RF 2Y	LT per 10 CFR 50, Appendix J
30JNA10 AA003	RHR Outside CIV	GB	MO	2	A	A	O/C	ET ST LT PI	Q Q 2Y 2Y	LT per 10 CFR 50, Appendix J
30JNA10 AA009	RHR 1st RCPB Bypass Check Valve (PIV)	CK	SA	2	A/C	A	O/C	ET LT	CS 2Y	Pressure Isolation Valve
30JNA10 AA101	LHSI Heat Exchanger Bypass Control Valve	GB	MO	2	A	A	O/C	ET LT PI	Q 2Y 2Y	
30JNA10 AA191	RHR Suction Line Safety Relief Valve	RV	SA	2	C	A	O	ET PI	10Y 2Y	

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Valve Identification Number[1]	Description/ Valve Function	Valve Type[2]	Valve Actuator[3]	ASME Code Class[4]	ASME OM Code Category[5]	Active / Passive[6]	Safety Position[7]	Test Required[8]	Test Frequency[9]	Comments
30JNG43AA197	Accumulator Safety Relief Valve	RV	SA	2	C	A	O	ET PI	10Y 2Y	
30JNG43AA197	Accumulator Safety Relief Valve	RV	SA	2	C	A	O	ET PI	10Y 2Y	
30JNG43AA502	Accumulator Depressurization Isolation Valve	GB	MO	2	A	P	C	ET LT PI	Q 2Y 2Y	
30JNG43AA502	Accumulator Depressurization Isolation Valve	GB	MO	2	A	P	C	ET LT PI	Q 2Y 2Y	
30JNG45AA001	Dead Leg Pressurization Valve	GB	MO	1	A	A	C	ET LT PI	CS 2Y 2Y	
30JNG45AA002	RCS Suction Line Pressurization Valve	GB	MO	1	A	A	C	ET LT PI	CS 2Y 2Y	
30JNG45AA003	Dead Leg Pressure Bypass Isolation Valve (PIV)	GB	MO	2	A	A	C	ET LT PI	CS 2Y 2Y	Pressure Isolation Valve
30JNG45AA004	Dead Leg Pressure Control Isolation Valve (PIV)	GB	MO	1	A	A	C	ET LT PI	CS RF 2Y	Pressure Isolation Valve
30JNK10AA001	IRWST 3-Way Isolation Valve	GB	MO	2	A	A	O	ET LT PI	Q RF 2Y	LT per 10CFR50, Appendix J

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Valve Identification Number[1]	Description/ Valve Function	Valve Type[2]	Valve Actuator[3]	ASME Code Class[4]	ASME OM Code Category[5]	Active / Passive[6]	Safety Position[7]	Test Required[8]	Test Frequency[9]	Comments
30JNK20AA001	IRWST 3-Way Isolation Valve	GB	MO	2	A	A	O	ET LT PI	Q RF 2Y	LT per 10CFR50, Appendix J
30JNK30AA001	IRWST 3-Way Isolation Valve	GB	MO	2	A	A	O	ET LT PI	Q RF 2Y	LT per 10CFR50, Appendix J
30JNK40AA001	IRWST 3-Way Isolation Valve	GB	MO	2	A	A	O	ET LT PI	Q RF 2Y	LT per 10CFR50, Appendix J
30JNK10AA009	1st CVCS Suction Isolation Valve From IRWST	GB	MO	2	A	A	O	ET LT PI	Q RF 2Y	LT per 10CFR50, Appendix J
30JNK11AA009	1st SAHRS Suction Isolation Valve from IRWST	GB	MO	2	A	A	O	ET LT PI	Q RF 2Y	LT per 10CFR50, Appendix J
30JNK10AA010	SIS-IRWST Miniflow Line Check Valve	CK	SA	2	C	A	O/C	ET	CS	
30JNK11AA010	SIS-IRWST Miniflow Line Check Valve	CK	SA	2	C	A	O/C	ET	CS	
30JNK10AA011	SIS-IRWST Miniflow Line Check Valve	CK	SA	2	C	A	O/C	ET	CS	

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Valve Identification Number[1]	Description/ Valve Function	Valve Type[2]	Valve Actuator[3]	ASME Code Class[4]	ASME OM Code Category[5]	Active / Passive[6]	Safety Position[7]	Test Required[8]	Test Frequency[9]	Comments
30JNK11AA011	SIS-IRWST Miniflow Line Check Valve	CK	SA	2	C	A	O/C	ET	CS	
30JNK10AA045	Annulus Region Drain Line Isolation Valve (CVCS Suction Line)	GB	MA	2	A	P	C	LT PI	2Y 2Y	
30JNK11AA045	Annulus Region Drain Line Isolation Valve (SAHRS Suction Line)	GB	MA	2	A	P	C	LT PI	2Y 2Y	
30KAA10AA004	CCW Hx (KAA10 AC001) outlet check valve	CK	SA	3	C	A	O	ET	Q	
30KAA10AA006	Quick Closing Valve for KAA10 to Common1B	BF	HO	3	A	A	O/C	ET ST LT PI	Q Q 2Y 2Y	
30KAA10AA010	Quick Closing Valve for Common1B to KAA10	BF	HO	3	A	A	O/C	ET ST LT PI	Q Q 2Y 2Y	

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Valve Identification Number[1]	Description/ Valve Function	Valve Type[2]	Valve Actuator[3]	ASME Code Class[4]	ASME OM Code Category[5]	Active / Passive[6]	Safety Position[7]	Test Required[8]	Test Frequency[9]	Comments
30PEB10AA002	Recirc isolation PEB10 AP001	BF	MO	3	B	A	C	ET PI	Q 2Y	
30PEB10AA003	Emer. blowdown isolation PEB10	BF	MO	3	B	A	C	ET PI	Q 2Y	
30PEB10AA005	Pump discharge isolation PEB10 AP001	BF	MO	3	B	A	O	ET PI	Q 2Y	
30PEB10AA007	Isolation upstreamKAA10 AC001	BF	MA	3	B	A	O	ET PI	5Y 2Y	
30PEB10AA009	Isolation downstream KAA10 AC001	BF	MA	3	B	A	O	ET PI	5Y 2Y	
30PEB10AA015	Filter blowdown isolation PEB10 AP001	GT	MO	3	B	A	C	ET PI	Q 2Y	
30PEB10AA016	Blowdown isolation PEB10	GB	MO	3	B	A	C	ET PI	Q 2Y	
30PEB10AA190	Air release downstream PEB10 AP001	RV	SA	3	C	A	O/C	ET LT PI	10Y 10Y 2Y	
30PEB~~10~~11AA191	Vacuum breaker downstream SAQ10 AC001	RV	SA	3	C	A	O/C	ET LT PI	~~10Y~~2Y 10Y 2Y	

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Valve Identification Number[1]	Description/ Valve Function	Valve Type[2]	Valve Actuator[3]	ASME Code Class[4]	ASME OM Code Category[5]	Active / Passive[6]	Safety Position[7]	Test Required[8]	Test Frequency[9]	Comments
30PEB20AA002	Recirculation Isolation PEB20 AP001	BF	MO	3	B	A	C	ET PI	Q 2Y	
30PEB20AA003	Emergency blowdown Isolation PEB20	BF	MO	3	B	A	C	ET PI	Q 2Y	
30PEB20AA005	Pump discharge Isolation PEB20 AP001	BF	MO	3	B	A	O	ET PI	Q 2Y	
30PEB20AA007	Isolation upstream KAA20 AC001	BF	MA	3	B	A	O	ET PI	5Y 2Y	
30PEB20AA009	Isolation downstream KAA20 AC001	BF	MA	3	B	A	O	ET PI	5Y 2Y	
30PEB20AA015	Filter blowdown Isolation PEB20 AP001	GT	MO	3	B	A	C	ET PI	Q 2Y	
30PEB20AA016	Blowdown Isolation PEB20	GB	MO	3	B	A	C	ET PI	Q 2Y	
30PEB20AA190	Air release downstream PEB20 AP001	RV	SA	3	C	A	O/C	ET LT PI	10Y 10Y 2Y	
30PEB~~20~~21AA191	Vacuum breaker downstream SAQ20 AC001	RV	SA	3	C	A	O/C	ET LT PI	~~10Y~~2Y 10Y 2Y	

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Valve Identification Number[1]	Description/ Valve Function	Valve Type[2]	Valve Actuator[3]	ASME Code Class[4]	ASME OM Code Category[5]	Active / Passive[6]	Safety Position[7]	Test Required[8]	Test Frequency[9]	Comments
30PEB30AA016	Blowdown Isolation PEB30	GB	MO	3	B	A	C	ET PI	Q 2Y	
30PEB30AA190	Air release downstream PEB30 AP001	RV	SA	3	C	A	O/C	ET LT PI	10Y 10Y 2Y	
30PEB~~30~~31AA191	Vacuum breaker downstream SAQ30 AC001	RV	SA	3	C	A	O/C	ET LT PI	~~10Y~~2Y 10Y 2Y	
30PEB30AA192	Thermal relief downstream KAA30 AC001	RV	SA	3	C	A	O/C	ET LT PI	10Y 10Y 2Y	
30PEB30AA204	Pump Discharge Check PEB30 AP001	CK	SA	3	C	A	O	ET	Q	
30PEB30AA205	Blowdown check PEB30	CK	SA	3	C	A	C	ET	Q	
30PEB31AA001	Isolation upstream SAQ30 AC001	GB	MA	3	B	A	O	ET PI	5Y 2Y	
30PEB31AA002	Isolation downstream SAQ30 AC001	GB	MA	3	B	A	O	ET PI	5Y 2Y	
30PEB24AA001	Isolation upstream XJG40 AC002	BF	MA	3	B	A	O	ET PI	5Y 2Y	
30PEB24AA002	Isolation downstream XJG40 AC001	BF	MA	3	B	A	O	ET PI	5Y 2Y	

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Valve Identification Number[1]	Description/ Valve Function	Valve Type[2]	Valve Actuator[3]	ASME Code Class[4]	ASME OM Code Category[5]	Active / Passive[6]	Safety Position[7]	Test Required[8]	Test Frequency[9]	Comments
30PEB40AA190	Air release downstream PEB40 AP001	RV	SA	3	C	A	O/C	ET LT PI	10Y 10Y 2Y	
30PEB~~40~~41AA191	Vacuum breaker downstream SAQ40 AC001	RV	SA	3	C	A	O/C	ET LT PI	~~10Y~~2Y 10Y 2Y	
30PEB40AA192	Thermal relief downstream KAA40 AC001	RV	SA	3	C	A	O/C	ET LT PI	10Y 10Y 2Y	
30PEB40AA204	Pump Discharge Check PEB40 AP001	CK	SA	3	C	A	O	ET	Q	
30PEB40AA205	Blowdown check PEB40	CK	SA	3	C	A	C	ET	Q	
30PEB41AA001	Isolation upstream SAQ40 AC001	GB	MA	3	B	A	O	ET PI	5Y 2Y	
30PEB41AA002	Isolation downstream SAQ40 AC001	GB	MA	3	B	A	O	ET PI	5Y 2Y	
30PEB41AA011	DED SYSTEM Check upstream SAQ40 AC001	CK	SA	3	C	A	O	ET PI	Q 2Y	
30PEB80AA002	Pump Discharge Check PEB80 AP001	CK	SA	3	C	A	O	ET	Q	